

Effect of heat generation on the onset of Marangoni convection in superposed layers of fluid and saturated porous medium.

ABSTRACT

Linear stability analysis is applied to investigate the effect of internal heat generation on Marangoni convection in a two-layer system comprising an incompressible fluid-saturated porous layer over which lies a layer of the same fluid. The lower rigid surface and the upper non-deformable surface are assumed to be perfectly insulating. The critical eigenvalues are solved exactly and the asymptotic solution of the long wavelength is also obtained using regular perturbation technique. The effect of variation of different physical parameters on the onset of Marangoni convection in the presence of heat generation is investigated in details. The internal heating in the fluid layer and the porous layer are found to decrease the critical conditions.

Keyword: Marangoni convection; Heat generation; Porous medium.